

Original Research

Mercury poisoning associated with a Mexican beauty cream

ABSTRACT ● **Objectives** To describe demographic characteristics, patterns of use, and symptoms associated with mercury poisoning among persons who used a Mexican beauty cream containing mercurous chloride and to estimate the prevalence of cream use in Texas near the Mexico border. ● **Design** Case series and cross-sectional survey. ● **Setting** Border communities of Arizona, California, New Mexico, and Texas. ● **Participants** Persons who used the cream and contacted a health department in response to announcements about the cream and households that participated in the Survey of Health and Environmental Conditions in Texas Border Counties and Colonias, 1997. ● **Main outcome measures** Urine mercury concentrations, self-reported symptoms, and prevalence of cream use among households. ● **Results** Of 330 cream users who contacted their health department, 96% were women, and 95% were Hispanic. The mean urine mercury concentration was 146.7 µg/L (reference range: 0-20 µg/L). In 5% of 2,194 randomly selected Texas households near the Mexico border, at least 1 person had used "Crema de Belleza-Manning" (Laboratorios Vida Natural, S.A., Tampico, Tamaulipas, Mexico) in the previous year. ● **Conclusions** Most cream users had increased urine mercury concentrations. Cream use was common in Texas near the Mexico border. Physicians should consider toxicity in patients with neurologic symptoms of unclear cause and use public health departments when investigating unusual illnesses.

INTRODUCTION

Mercury-containing compounds have historically been used in germicidal soaps,¹ teething powders,² medications for psoriasis and syphilis,^{3,4} Chinese patent medicines,⁵ and skin preparations including skin-lightening creams.⁶⁻⁸ Mercurial compounds can be absorbed through intact skin.^{9,10} Toxic renal,^{6,7,11} neurologic,^{4,12} and dermal^{2,12-14} effects related to the use of topically applied products have been documented in the literature since the early 20th century. Almost all mercury compounds have demonstrated teratogenic effects in animal studies; however, only several compounds have been associated with congenital abnormalities in humans.¹⁵ Because the toxicity of mercurial compounds in skin products far overshadowed their antibacterial and other purported clinical benefits, in 1973, the US Food and Drug Administration banned use of the compounds in over-the-counter skin preparations, except in special circumstances as a preservative in low concentrations (<0.0065%).¹⁶ Mercury-containing skin preparations, however, continue to be unregulated and available in other countries around the world.¹

BACKGROUND

In November 1995, a San Antonio physician contacted the Texas Department of Health (TDH) and requested assistance in identifying the cause of mercury poisoning in a 15-year-old male adolescent who had no obvious source of exposure. In September 1995, the previously healthy boy, who resided in Texas near the Mexico border, had the onset of fatigue, weakness, insomnia, myalgias of his

Summary points

- Mercury poisoning has been associated with the use of a mercury-containing beauty cream from Mexico
- The mean urine mercury level among cream users was 146.7 µg/L (reference range 0-20 µg/L).
- Use of the cream is prevalent in border communities
- Physicians should consider mercury toxicity in cases of neurologic symptoms of unclear etiology

extremities, severe headache, sore throat, cough, constipation, and paresthesias of his hands and feet. Subsequent problems developed, including the loss of taste, weight loss of about 7 kg (15 lb), and progressive weakness of his arms and legs. A neurologist in Piedras Negras, Mexico, performed electromyelography and measured nerve-conduction velocities, results of which were consistent with a demyelinating polyneuropathy.¹⁷

In November 1995, the adolescent was evaluated at a hospital in San Antonio, where a magnetic resonance imaging scan of his brain was normal. Findings on examination by a pediatric neurologist included intact cranial nerve function, diffusely decreased deep tendon reflexes, and mild weakness of the lower extremities. The results of a routine heavy metal screen were unremarkable except for a urine mercury concentration of 178 µg/L (reference range: 0-20 µg/L),¹⁸ and chelation therapy with penicillamine was initiated.¹⁷

The TDH's Office of Border Health conducted an environmental assessment of the adolescent's home in De-

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cember 1995 and did not detect mercury in paint, soil, or indoor air. Family members reported that they ate fish from Mexico once or twice per year and denied activities at home, school, or work known to be associated with mercury exposure. However, a container of “Crema de Belleza-Manning” that was used regularly by the adolescent for treatment of acne listed calomel (mercurous chloride) as an ingredient. Laboratory analyses indicated that bottles of the beauty cream contained 6% to 10% mercury by weight. The adolescent had been using the cream daily since June 1995 and was advised to discontinue its use immediately.^{17,18}

The TDH publicized the dangers of the cream; subsequently, additional cases of mercury poisoning associated with cream use were identified in the United States. This report describes the results of a collaborative investigation among the TDH, the Arizona Department of Health Services, Phoenix; the California Department of Health Services, Berkeley; the New Mexico Department of Health, Santa Fe; the San Diego County Health Department, San Diego, California; and the Centers for Disease Control and Prevention (CDC), Atlanta, Georgia. The objectives of the investigation were to describe demographic characteristics of users of Crema de Belleza-Manning, patterns of cream use, and health problems associated with its use. A previously planned household survey of the Texas-Mexico border area was used to estimate the prevalence of cream use.

PARTICIPANTS AND METHODS

Study population

Public announcements in the 4 border states, issued as early as April 1996, warned the public about the dangers of Crema de Belleza-Manning, told users to stop using the product, and requested that cream users call their local health departments. The public announcements were made through English- and Spanish-language television and radio stations, newspapers, posters, and fliers. Residents of the 4 states who contacted a local or state health department in response to the public announcements and who reported having used Crema de Belleza-Manning were asked to participate in the study. All cream users were advised to stop using the cream immediately and to consult with a physician. In addition, they were instructed how to obtain a urine mercury test and to dispose of leftover cream.

Data collection

Information regarding persons who used the cream was collected through 2 telephone surveys administered in English or Spanish. A few surveys were administered in per-

son at local health offices. The purpose of the initial survey was to assist investigators in rapidly assessing the nature and extent of problems related to cream use; it was conducted between April and October 1996. Information was collected regarding the reason for cream use, frequency and duration of cream use, the location of the cream purchase, the presence of symptoms associated with mercury poisoning, and other possible sources of mercury exposure. The follow-up survey was conducted between October and December 1996, when additional detailed information was collected about patterns of use and symptoms.

Laboratory analysis

Urine specimens were collected at public health clinics, hospitals, and private physicians' offices. Several public and private laboratories analyzed the specimens. Laboratory results either were reported directly to the health department or were requested from cream users' physicians.

Statistical analyses

Data were analyzed using a statistics software program for epidemiology (Epi Info, version 6.1; CDC).

Prevalence of cream use

The Survey of Health and Environmental Conditions in Texas Borders Counties and Colonias, a collaborative effort by the TDH, CDC, and US Environmental Protection Agency, collected cross-sectional data on environmental health conditions from randomly selected households in Cameron, Hidalgo, Webb, El Paso, Maverick, and Val Verde counties, the 6 most populous Texas counties on the Mexico border. In May 1996, 2 questions were added to the survey to determine the prevalence of cream use by households and to determine what proportion of the population had heard announcements about the dangers of the cream. Participants were asked, “Have you or anyone in your household used ‘Crema de Belleza-Manning’ in the past year?” and “Have you heard any warnings about this cream?” Interviews were conducted in person by bilingual interviewers.

RESULTS

Descriptive study of cream users

A total of 330 cream users contacted 1 of the 4 state health departments. Of the cream users, 317 (96%) were women. Only the women were included in the following analyses. All 317 women (100%) responded to the initial survey, and 204 (64%) responded to the follow-up survey.

Table 1 Demographic characteristics of women who used "Crema de Belleza-Manning" and who responded to public warnings about the cream in Arizona, California, New Mexico, and Texas, 1995 to 1996

Characteristics	Women, %
<i>State of residence (n = 317)</i>	
Arizona	45
California	18
New Mexico	15
Texas	22
<i>Age, yr (n = 315)</i>	
<28	34
28-38	33
>38	33
<i>Ethnicity (n = 204)</i>	
Hispanic	95
Non-Hispanic	5
<i>Education (n = 198)</i>	
8 years or less	29
9 years or more	71
<i>Health Insurance (n = 233)</i>	
Yes	61
No	39
<i>Country of cream purchase (n = 215)</i>	
United States	21
Mexico	79

Table 2 Patterns of Mexican cream use among women in Arizona, California, New Mexico, and Texas, 1995 to 1996

Variable	Result
Test interval * (n = 203), days, median	58
Duration of use (n = 256), yr, median	4.0
<i>Frequency of use (n = 290), %</i>	
Less than once per day	18
Once per day	30
2-3 times per day	52
<i>Reason for using cream (n = 280), %</i>	
Skin lightener	44
Acne treatment	30
Moisturizer	9

*Number of days between stopping cream use and submitting urine specimen for testing.

Table 1 presents demographic characteristics of female cream users. The median age of cream users was 32 years (range: 14-79 years). Most women purchased the cream in Mexico; however, 21% purchased the cream in the United States, usually at a flea market or herb shop. The patterns of cream use are presented in table 2.

Urine mercury concentrations were measured in 203 (64%) of the 317 women. Because the half-life of inorganic mercury in humans is about 40 days,¹⁹ specimens

submitted more than 120 days after the cessation of cream use were considered poor estimates of past concentrations. Of the 150 women who were tested within 120 days of the cessation of cream use, the mean mercury concentration was 146.7 µg/L (median: 79.0 µg/L; range: 0-1,170 µg/L).²⁰ One hundred twenty-six women (84%) had concentrations of greater than 20 µg/L. For the 53 women (26%) tested more than 120 days after the cessation of cream use, 26 (49%) had urine mercury concentrations above 20 µg/L, and 7 (13%) had concentrations above 100 µg/L.

Cream users self-reported a high prevalence of symptoms associated with mercury poisoning: fatigue (67%), nervousness and/or irritability (63%), severe headaches (61%), insomnia (51%), memory loss (44%), loss of strength in legs (44%), tingling or burning sensations (39%), tremors or shaking of the hands (38%), depression (31%), and a metallic taste in the mouth (20%). Forty-six percent reported having seen a physician for symptoms associated with mercury poisoning.

Fish consumption, a risk factor for exposure to mercury, was infrequent during the 30 days before a urine specimen was submitted. Only 4 women worked in occupations that may have put them at risk for exposure to mercury, 1 as a dentist and 3 as painters.

Prevalence of cream use

In 104 (5%) of the 2,194 households surveyed, at least 1 person reported having used Crema de Belleza-Manning in the past year; 820 (37%) households had heard warnings about the dangers of the cream.

DISCUSSION

We detected high urine mercury concentrations and a high prevalence of symptoms characteristic of mercury poisoning among women who used Crema de Belleza-Manning. Many of the women who used the cream reported seeking medical attention for symptoms characteristic of mercury poisoning. We were aware, however, of only 1 long-time cream user who was diagnosed with mercury poisoning before this study, and no source of mercury exposure was identified in this person until public announcements about Crema de Belleza-Manning were made in April 1996.

Although the results of this study clearly indicate that use of the cream was hazardous, interpretation of the data is limited. The study, which was rapidly conducted to assess the extent and severity of a public health emergency, has 2 primary weaknesses: lack of a nonexposed comparison group, and selection bias. Women who contacted

their health department may have had disproportionately more health problems and symptoms than women who used the cream but chose not to contact their health department. An accurate assessment of exposure was also limited by some women's difficulty recalling and quantifying the volume of cream used and other use patterns. Further, there were no clinical evaluations to objectively measure health problems. An independent study conducted in Arizona, however, included clinical evaluations of 55 persons who used the cream. Although no major abnormalities were found, the urine mercury concentrations of former cream users declined over time from a median of 170 $\mu\text{g/L}$ to 32 $\mu\text{g/L}$ after an average of 139 days.²¹ A New Mexico study also found median urine mercury concentrations among 25 users of the cream to be 4 times greater than among controls.²²

The high urine mercury concentrations clearly confirm exposure to mercury among the women who used the cream. The reported concentrations, however, may not have been precise measurements of mercury excretion because single-void rather than standard 24-hour specimens were collected. Single-void specimens, even those not adjusted for creatinine clearance, have been found to correlate fairly well with 24-hour averages.²³ The additional effects of interlaboratory differences were not evaluated. Overall, however, reported urine mercury concentrations were probably an underestimate of peak concentrations due to the lag time between the cessation of cream use and the collection of a urine specimen. Despite this, more than one fourth of the women tested more than 120 days after the cessation of cream use had urine mercury concentrations above the reference range.

Data from the Survey of Health and Environmental Conditions in Texas Border Counties and Colonias indicated that use of Crema de Belleza-Manning was common, at least in Texas near the Mexico border. Interviews with cream users led to the identification of a second mercury-containing beauty cream produced in Mexico, "Nutrapiel Cremaning," and in April 1997, Canadian health officials issued an alert regarding "Diana Cream," a mercury-containing beauty cream produced in Lebanon.²⁴ Although these products cannot be legally sold in the United States, this study indicated that Crema de Belleza-Manning was, in fact, available in this country. Most cream users, however, purchased the cream in Mexico and brought it back to the United States. Crema de Belleza-Manning was produced in Mexico since at least 1971 before its dangers were recognized. It is likely that many bottles still sit in bathroom cabinets, along with other mercury-containing products from around the world. Physicians should consider mercury poisoning in any patient presenting with neurologic symptoms of unclear cause and should be reminded to use their health departments to investigate the causes of unusual illnesses.

This study highlights the need for continued international standards for the use of mercury in skin preparations.

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